

REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 1-17 are in the case.

I. THE INTERVIEW

At the outset, the undersigned wishes to thank the Examiner (Mr. Baldwin) and the Examiner's supervisor (Ms. McNeil) for kindly agreeing to discuss this case. The interviews were held on May 18, 2006, and the courtesies extended by the Mr. Baldwin and Ms. McNeil were most appreciated. The case was discussed briefly with Mr. Baldwin, and the details of the outstanding action were discussed with Ms. McNeil. The substance of the interview with Ms. McNeil will be clear from the comments presented below.

II. THE OBVIOUSNESS REJECTION

Claims 1-17 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. Patent 4,585,481 to Gupta et al. That rejection is respectfully traversed.

As explained to Ms. McNeil, the invention as claimed is directed to a method of stabilizing adherence of a ceramic layer to a bond coat of a TBC system. The method comprises incorporating silicon into the bond coat and maintaining cobalt present in the bond coat at a level of 0-5 wt%.

Gupta (acknowledged at page 2 of the present application) relates to MCrAlY-type overlay coating compositions (where M is nickel or cobalt) for protecting superalloys at elevated temperatures, and is not concerned with TBC systems. Silicon and hafnium may be added (see Gupta Abstract). However, due to the difference

between TBC coating spallation, with which the present case is concerned, and overlay coating oxidation referred to in Gupta, an overlay coating with oxidation resistance does not necessarily lead to a good TBC spallation life when used as TBC bond coat.

As explained in the prior response, three years later, Vine et al. (US patent 4,861,618 – acknowledged at paragraph [0006] of the present application) describes a NiCoCrAlY bond coat to improve TBC spallation life. The Vine coating contains 15-40% Co, 10-40%Cr, 5-15%Al, 0-2%Hf, 0-7%Si, 0.01-1.0%Y. The Vine approach is based on improvement of TBC coating. The major difference between Vine and the present invention is the limitation of Co in the present invention. It has been found according to the present invention that Co increases thermal expansion coefficient of the coating, and therefore reduces adhesion of the bond coat and ceramic TBC top coat.

In contrast, the thermal expansion coefficient increase of MCrAlY coating is not important for an overlay coating, and sometimes can be beneficial because it produces compressive stresses on the overlay coating itself. It is important however to TBC coating life. This phenomenon was not recognized by Gupta and Vine.

The work described in the present case (see Figure 1) demonstrates that there is a deleterious effect on TBC spallation life when the level of cobalt increases above about 5 wt% in MCrAlY-base bond coats. This is not suggested by Gupta.

Experimentation described in the present specification indicates that TBC spallation life with the identified chemistry range increases by about 30%, which can be translated to an improvement of about 40 degrees F in the operating temperature of gas turbine components. While Gupta refers (in Table 1) generally to coatings in which there is either no cobalt present, or "0-30", or "15-25" or "Balance", Table 2 on the other hand

refers to percentage cobalt levels of "22" or "23", and cobalt levels recited in the specification range from 10-20% (col. 5, line 21) to 15-25% (claims 3, 10 and 14).

Based on this, it is clear that one of ordinary skill would not have expected, based on Gupta, to achieve a stabilization of the adherence of a ceramic layer to a bond coat of a TBC system by incorporating silicon into the bond coat and maintaining cobalt present in the bond coat at level of 0-5 wt%.

In light of the above, the skilled artisan would not have been motivated to arrive at the presently claimed invention based on the Gupta disclosure. Absent any such motivation, a *prima facie* case of obviousness has not been generated in this case.

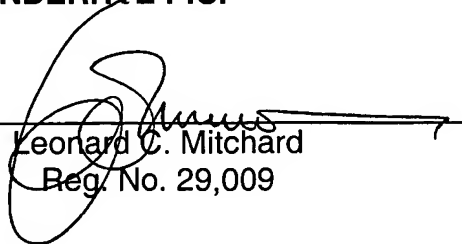
During the interview with Ms. McNeil, it was agreed that the obviousness rejection based on Gupta alone would be withdrawn. Such action is respectfully requested.

Favorable action on this application is awaited.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____


Leonard C. Mitchard
Reg. No. 29,009

LCM:lfm
901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100